

ABSTRACT

A method for preventing oxidation of a barrier metal layer of a semiconductor device is disclosed. The method comprises the following steps. $\text{Ti/Ti}_{(1-x)}\text{Al}_x\text{N}$ is deposited on the bottom and sidewalls of a via hole in a substrate by a plasma chemical vapor deposition to form a first barrier metal layer. The via hole is filled with a plug material and a planarization process is performed to form a via plug. A second barrier metal layer and a metal line are deposited in sequence on the substrate including the via plug. Then, $\text{Ti/Ti}_{(1-x)}\text{Al}_x\text{N}$ as an ARC layer is deposited on the metal line by a plasma chemical vapor deposition. Accordingly, the present invention can improve device reliability by controlling continuous oxidation of the barrier metal layer using $\text{Ti}_{(1-x)}\text{Al}_x\text{N}$ formed by addition of aluminum to TiN .